

L O O P

Version 4.0

Looped Water Distribution Network Design Program

LOOP: Looped Water Distribution Design Program - (C) The World Bank

Output Data File : UIDBPR3.OUT

Echoing Input Design Variables

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Title of the Project          : uidssmt at bisnupur z 2
Name of the User             : otd
Number of Pipes              : 90
Number of Nodes              : 72
Type of Pipe Materials Used  : DI/
Number of Commercial Dia per Material : 7/
Peak Design Factor           : 3
Newton-Raphson Stopping Criterion lps : .001
Minimum Pressure             m   : 5
Maximum Pressure             m   : 45
Design Hydraulic Gradient m in km : 2
Simulate or Design?         (S/D) : D
No. of Res. Nodes with Fixed HGL : 1
No. of Res. Nodes with Variable HGL : 0
No. of Booster Pumps        : 0
No. of Pressure Reducing Valves : 0
No. of Check Valves         : 0
Type of Formula              : Hazen's

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Looped Water Distribution Network Design OutPut

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BandWidth                   =      3
Number of Loops              =     19
Newton Raphson Iterations =      2

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Pipe Details

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Pipe  From To   Flow   Dia   HL   HL/1000m  Length Velocity
No.  Node Node (lps) (mm) (m ) (m ) (m ) (m/s )
-----
  1    1   2   108.090 250.0 11.67 15.74 741.00 2.20
  2    3   4    0.630  65.0  0.35  1.51 235.00 0.19
  3    3   5    6.240 150.0  0.50  0.96 523.00 0.35
  4    2   3    7.500 150.0  0.18  1.35 131.00 0.42
  5    2   8   61.604 250.0  1.26  5.56 227.00 1.25
  6    2   6   37.726 250.0  0.39  2.24 175.00 0.77
  7    6   7   17.354 200.0  0.14  1.58  88.00 0.55
  8    6   9   19.112 200.0  0.31  1.89 165.00 0.61
  9    7  11   16.094 200.0  0.54  1.37 390.00 0.51
 10    8   9   -9.597 150.0 -0.56 -2.14 261.00 -0.54

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(28)

11	8	14	69.671	250.0	0.91	6.98	131.00	1.42
12	14	13	-20.239	200.0	-0.52	-2.10	250.00	-0.64
13	9	10	8.255	150.0	0.24	1.62	150.00	0.47
14	10	11	7.025	150.0	0.12	1.20	100.00	0.40
15	13	12	-21.499	200.0	-0.19	-2.35	80.00	-0.68
16	12	11	-22.189	200.0	-0.40	-2.49	160.00	-0.71
17	14	15	88.590	250.0	0.44	10.89	40.00	1.80
18	15	16	39.304	250.0	0.74	2.42	305.00	0.80
19	15	20	47.756	250.0	0.49	3.47	140.00	0.97
20	16	17	0.810	65.0	0.52	2.41	218.00	0.24
21	16	18	37.774	250.0	0.22	2.25	96.00	0.77
22	18	19	0.900	65.0	0.13	2.92	45.00	0.27
23	18	20	-29.846	250.0	-0.47	-1.45	322.00	-0.61
24	20	69	11.396	150.0	0.26	2.94	87.00	0.64
25	20	29	4.153	100.0	0.31	3.27	96.00	0.53
26	69	70	1.499	80.0	0.89	2.74	325.00	0.30
27	69	72	8.217	150.0	0.45	1.60	279.00	0.46
28	72	71	1.542	80.0	0.95	2.88	330.00	0.31
29	72	21	4.995	100.0	1.29	4.60	280.00	0.64
30	21	22	4.035	100.0	0.33	3.10	106.00	0.51
31	22	23	0.277	50.0	0.13	1.19	110.00	0.14
32	23	24	-1.613	80.0	-0.37	-3.13	117.00	-0.32
33	22	25	2.348	100.0	0.14	1.14	119.00	0.30
34	25	26	0.930	65.0	0.22	3.11	70.00	0.28
35	25	27	0.338	50.0	0.22	1.71	130.00	0.17
36	27	28	-0.652	65.0	-0.20	-1.61	125.00	-0.20
37	28	24	-1.462	80.0	-0.39	-2.61	150.00	-0.29
38	24	71	-4.005	100.0	-0.43	-3.05	140.00	-0.51
39	71	70	-3.633	100.0	-0.51	-2.55	200.00	-0.46
40	70	30	-3.304	100.0	-0.30	-2.14	138.00	-0.42
41	30	32	-0.595	65.0	-0.14	-1.36	100.00	-0.18
42	30	29	-3.399	100.0	-0.54	-2.25	238.00	-0.43
43	29	31	0.064	50.0	0.01	0.08	87.00	0.03
44	31	32	1.105	80.0	0.39	1.56	253.00	0.22
45	33	35	59.370	250.0	0.28	5.19	53.00	1.21
46	18	33	65.670	250.0	0.82	6.26	131.00	1.34
47	33	34	5.370	100.0	0.96	5.26	183.00	0.68
48	35	36	4.230	100.0	0.44	3.38	131.00	0.54
49	35	37	54.210	250.0	0.76	4.39	174.00	1.10
50	37	38	51.570	250.0	0.84	4.00	209.00	1.05
51	38	39	8.307	150.0	0.13	1.64	78.00	0.47
52	39	40	1.440	80.0	0.40	2.54	157.00	0.29
53	41	42	1.440	80.0	0.44	2.54	174.00	0.29
54	41	43	2.097	80.0	0.44	5.09	87.00	0.42
55	39	41	4.947	100.0	0.59	4.52	131.00	0.63
56	48	43	-0.207	50.0	-0.26	-0.69	383.00	-0.11
57	47	48	1.893	80.0	0.73	4.22	174.00	0.38
58	47	45	-26.099	200.0	-0.35	-3.36	105.00	-0.83
59	45	38	-40.683	250.0	-0.34	-2.58	132.00	-0.83
60	45	44	11.915	150.0	0.42	3.19	131.00	0.67
61	44	46	9.275	150.0	0.26	2.01	131.00	0.52
62	46	47	-22.285	200.0	-0.33	-2.51	131.00	-0.71
63	46	49	29.670	250.0	0.12	1.44	87.00	0.60
64	49	50	6.861	150.0	0.17	1.15	151.00	0.39
65	49	53	20.709	200.0	0.21	2.19	96.00	0.66
66	53	54	10.289	150.0	0.34	2.43	140.00	0.58
67	54	55	4.050	100.0	0.16	3.12	50.00	0.52
68	50	52	3.321	100.0	0.33	2.16	154.00	0.42
69	52	55	1.431	80.0	0.20	2.51	80.00	0.28
70	54	55	0.279	50.0	0.16	1.20	130.00	0.14

71	55	56	0.810	65.0	0.36	2.41	150.00	0.24
72	55	59	2.970	100.0	0.26	1.76	150.00	0.38
73	54	58	3.769	100.0	0.42	2.73	155.00	0.48
74	53	57	8.111	150.0	0.25	1.57	160.00	0.46
75	57	58	1.916	80.0	0.51	4.31	119.00	0.38
76	58	59	-0.038	50.0	-0.00	-0.03	130.00	-0.02
77	59	60	1.492	80.0	0.27	2.71	100.00	0.30
78	58	61	3.714	100.0	0.28	2.66	107.00	0.47
79	61	60	-0.082	50.0	-0.02	-0.12	135.00	-0.04
80	61	63	1.606	80.0	0.33	3.11	106.00	0.32
81	57	62	4.094	100.0	0.61	3.18	191.00	0.52
82	62	63	0.910	65.0	0.52	2.98	174.00	0.27
83	62	66	1.954	80.0	0.74	4.47	166.00	0.39
84	66	64	0.094	50.0	0.04	0.16	241.00	0.05
85	66	67	1.290	80.0	0.15	2.07	72.00	0.26
86	67	68	0.810	65.0	0.57	2.41	238.00	0.24
87	63	64	1.286	80.0	0.26	2.06	127.00	0.26
88	64	65	0.690	65.0	0.07	1.79	40.00	0.21
89	51	50	-1.650	80.0	-0.13	-3.27	40.00	-0.33
90	20	31	1.551	80.0	0.32	2.91	110.00	0.31

Note: Negative value indicates the flow in reverse direction in that Pipe

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Output Data File : UIDBPR3.OUT

Pipe Pressure Details

Pipe No.	From Node	To Node	Dia (mm)	Hazen's Const	Pipe Material	Max Press (m)	Allow Press (m)	Status (E/P)
1	1	2	250.0	140.00000	DI	19.58	125.00	
2	3	4	65.0	100.00000	DI	24.05	100.00	
3	3	5	150.0	140.00000	DI	35.15	125.00	
4	2	3	150.0	140.00000	DI	22.16	125.00	
5	2	8	250.0	140.00000	DI	20.57	125.00	
6	2	6	250.0	140.00000	DI	20.94	125.00	
7	6	7	200.0	140.00000	DI	26.30	125.00	
8	6	9	200.0	140.00000	DI	22.63	125.00	
9	7	11	200.0	140.00000	DI	26.30	125.00	
10	8	9	150.0	140.00000	DI	22.63	125.00	
11	8	14	250.0	140.00000	DI	26.66	125.00	
12	14	13	200.0	140.00000	DI	26.66	125.00	
13	9	10	150.0	140.00000	DI	22.89	125.00	
14	10	11	150.0	140.00000	DI	24.77	125.00	
15	13	12	200.0	140.00000	DI	24.68	125.00	
16	12	11	200.0	140.00000	DI	24.77	125.00	
17	14	15	250.0	140.00000	DI	26.66	125.00	
18	15	16	250.0	140.00000	DI	25.99	125.00	
19	15	20	250.0	140.00000	DI	27.74	125.00	
20	16	17	65.0	100.00000	DI	26.96	100.00	
21	16	18	250.0	140.00000	DI	27.77	125.00	
22	18	19	65.0	100.00000	DI	28.64	100.00	
23	18	20	250.0	140.00000	DI	27.77	125.00	
24	20	69	150.0	140.00000	DI	27.74	125.00	
25	20	29	100.0	140.00000	DI	29.42	125.00	
26	69	70	80.0	100.00000	DI	30.94	100.00	
27	69	72	150.0	140.00000	DI	27.23	125.00	
28	72	71	80.0	100.00000	DI	31.08	100.00	
29	72	21	100.0	140.00000	DI	26.28	125.00	
30	21	22	100.0	140.00000	DI	27.17	125.00	
31	22	23	50.0	100.00000	DI	28.54	100.00	

32	23	24	80.0	100.00000	DI	30.66	100.00
33	22	25	100.0	140.00000	DI	27.17	125.00
34	25	26	65.0	100.00000	DI	24.78	100.00
35	25	27	50.0	100.00000	DI	26.31	100.00
36	27	28	65.0	100.00000	DI	27.51	100.00
37	28	24	80.0	100.00000	DI	30.66	100.00
38	24	71	100.0	140.00000	DI	31.08	125.00
39	71	70	100.0	140.00000	DI	31.08	125.00
40	70	30	100.0	140.00000	DI	30.94	125.00
41	30	32	65.0	100.00000	DI	30.89	100.00
42	30	29	100.0	140.00000	DI	30.89	125.00
43	29	31	50.0	100.00000	DI	29.42	100.00
44	31	32	80.0	100.00000	DI	30.77	100.00
45	33	35	250.0	140.00000	DI	30.03	125.00
46	18	33	250.0	140.00000	DI	27.77	125.00
47	33	34	100.0	140.00000	DI	28.24	125.00
48	35	36	100.0	140.00000	DI	30.03	125.00
49	35	37	250.0	140.00000	DI	30.03	125.00
50	37	38	250.0	140.00000	DI	28.76	125.00
51	38	39	150.0	140.00000	DI	29.90	125.00
52	39	40	80.0	100.00000	DI	31.55	100.00
53	41	42	80.0	100.00000	DI	34.87	100.00
54	41	43	80.0	100.00000	DI	36.86	100.00
55	39	41	100.0	140.00000	DI	33.36	125.00
56	48	43	50.0	100.00000	DI	36.86	100.00
57	47	48	80.0	100.00000	DI	31.65	100.00
58	47	45	200.0	140.00000	DI	31.09	125.00
59	45	38	250.0	140.00000	DI	31.09	125.00
60	45	44	150.0	140.00000	DI	31.09	125.00
61	44	46	150.0	140.00000	DI	27.67	125.00
62	46	47	200.0	140.00000	DI	30.33	125.00
63	46	49	250.0	140.00000	DI	27.40	125.00
64	49	50	150.0	140.00000	DI	31.01	125.00
65	49	53	200.0	140.00000	DI	28.07	125.00
66	53	54	150.0	140.00000	DI	31.33	125.00
67	54	55	100.0	140.00000	DI	36.42	125.00
68	50	52	100.0	140.00000	DI	36.47	125.00
69	52	55	80.0	100.00000	DI	36.47	100.00
70	54	55	50.0	100.00000	DI	36.42	100.00
71	55	56	65.0	100.00000	DI	38.11	100.00
72	55	59	100.0	140.00000	DI	36.42	125.00
73	54	58	100.0	140.00000	DI	31.33	125.00
74	53	57	150.0	140.00000	DI	28.07	125.00
75	57	58	80.0	100.00000	DI	29.81	100.00
76	58	59	50.0	100.00000	DI	35.91	100.00
77	59	60	80.0	100.00000	DI	36.94	100.00
78	58	61	100.0	140.00000	DI	30.62	125.00
79	61	60	50.0	100.00000	DI	36.94	100.00
80	61	63	80.0	100.00000	DI	30.62	100.00
81	57	62	100.0	140.00000	DI	27.82	125.00
82	62	63	65.0	100.00000	DI	29.29	100.00
83	62	66	80.0	100.00000	DI	25.41	100.00
84	66	64	50.0	100.00000	DI	26.93	100.00
85	66	67	80.0	100.00000	DI	23.77	100.00
86	67	68	65.0	100.00000	DI	24.25	100.00
87	63	64	80.0	100.00000	DI	29.29	100.00
88	64	65	65.0	100.00000	DI	26.93	100.00
89	51	50	80.0	100.00000	DI	31.01	100.00
90	20	31	80.0	100.00000	DI	28.92	100.00

Node Details

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Node      Flow      Elev.      H G L      Pressure
No.      (lps)      ( m )      ( m )      ( m )
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  1 S    108.090    146.85    147.50      0.65
  2      -1.260    116.25    135.83     19.58
  3      -0.630    113.50    135.66     22.16
  4      -0.630    111.25    135.30     24.05
  5      -6.240    100.00    135.15     35.15
  6      -1.260    114.50    135.44     20.94
  7      -1.260    109.00    135.30     26.30
  8      -1.530    114.00    134.57     20.57
  9      -1.260    112.50    135.13     22.63
 10      -1.230    112.00    134.89     22.89
 11      -0.930    110.00    134.77     24.77
 12      -0.690    112.00    134.37     22.37
 13      -1.260    109.50    134.18     24.68
 14      -1.320    107.00    133.66     26.66
 15      -1.530    107.50    133.22     25.72
 16      -0.720    106.50    132.49     25.99
 17      -0.810    105.00    131.96     26.96
 18      -1.050    104.50    132.27     27.77
 19      -0.900    103.50    132.14     28.64
 20      -0.810    105.00    132.74     27.74
 21      -0.960    106.75    130.75     24.00
 22      -1.410    103.25    130.42     27.17
 23      -1.890    101.75    130.29     28.54
 24      -0.930    100.00    130.66     30.66
 25      -1.080    105.50    130.28     24.78
 26      -0.930    106.50    130.07     23.57
 27      -0.990    103.75    130.06     26.31
 28      -0.810    102.75    130.26     27.51
 29      -0.690    103.00    132.42     29.42
 30      -0.690    101.00    131.89     30.89
 31      -0.510    103.50    132.42     28.92
 32      -0.510    101.25    132.02     30.77
 33      -0.930    104.15    131.45     27.30
 34      -5.370    102.25    130.49     28.24
 35      -0.930    101.15    131.18     30.03
 36      -4.230    101.75    130.73     28.98
 37      -2.640    101.65    130.41     28.76
 38      -2.580    101.45    129.58     28.13
 39      -1.920     99.55    129.45     29.90
 40      -1.440     97.50    129.05     31.55
 41      -1.410     95.50    128.86     33.36
 42      -1.440     93.55    128.42     34.87
 43      -1.890     91.55    128.41     36.86
 44      -2.640    101.15    128.82     27.67
 45      -2.670     98.15    129.24     31.09
 46      -1.890    101.15    128.55     27.40
 47      -1.920     98.55    128.88     30.33
 48      -2.100     96.50    128.15     31.65
 49      -2.100    101.25    128.43     27.18

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50	-1.890	97.25	128.26	31.01
51	-1.650	97.20	128.13	30.93
52	-1.890	91.45	127.92	36.47
53	-2.310	100.15	128.22	28.07
54	-2.190	96.55	127.88	31.33
55	-1.980	91.30	127.72	36.42
56	-0.810	89.25	127.36	38.11
57	-2.100	100.15	127.97	27.82
58	-2.010	97.65	127.46	29.81
59	-1.440	91.55	127.46	35.91
60	-1.410	90.25	127.19	36.94
61	-2.190	96.55	127.17	30.62
62	-1.230	101.95	127.36	25.41
63	-1.230	97.55	126.84	29.29
64	-0.690	99.65	126.58	26.93
65	-0.690	100.25	126.51	26.26
66	-0.570	102.85	126.62	23.77
67	-0.480	102.85	126.47	23.62
68	-0.810	101.65	125.90	24.25
69	-1.680	105.25	132.48	27.23
70	-1.170	100.65	131.59	30.94
71	-1.170	100.00	131.08	31.08
72	-1.680	105.75	132.03	26.28

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Pipe Cost Summary

Diameter (mm)	Pipe Material	Length (m)	Cost (1000 Rs)	Cum. Cost (1000 Rs)
50.0	DI	1346.00	326.59	326.59
65.0	DI	1395.00	434.91	761.50
80.0	DI	2687.00	1103.23	1864.73
100.0	DI	2569.00	2382.26	4246.99
150.0	DI	2322.00	3121.30	7368.29
200.0	DI	1465.00	2831.32	10199.61
250.0	DI	2963.00	7683.83	17883.44

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LOOP: Looped Water Distribution Design Program - (C) The World Bank

Pipe-wise Cost Summary

Pipe No	Diameter (mm)	Pipe Material	Length (m)	Cost (1000 Rs)	Cum. Cost (1000 Rs)
1	250.0	DI	741.00	1921.61	1921.61
2	65.0	DI	235.00	73.26	1994.87
3	150.0	DI	523.00	703.03	2697.90
4	150.0	DI	131.00	176.09	2874.00
5	250.0	DI	227.00	588.67	3462.67
6	250.0	DI	175.00	453.82	3916.49
7	200.0	DI	88.00	170.07	4086.56
8	200.0	DI	165.00	318.89	4405.44
9	200.0	DI	390.00	753.73	5159.17

10	150.0	DI	261.00	350.84	5510.02
11	250.0	DI	131.00	339.72	5849.73
12	200.0	DI	250.00	483.16	6332.89
13	150.0	DI	150.00	201.63	6534.53
14	150.0	DI	100.00	134.42	6668.95
15	200.0	DI	80.00	154.61	6823.56
16	200.0	DI	160.00	309.22	7132.79
17	250.0	DI	40.00	103.73	7236.52
18	250.0	DI	305.00	790.94	8027.46
19	250.0	DI	140.00	363.06	8390.52
20	65.0	DI	218.00	67.96	8458.48
21	250.0	DI	96.00	248.95	8707.43
22	65.0	DI	45.00	14.03	8721.46
23	250.0	DI	322.00	835.03	9556.49
24	150.0	DI	87.00	116.95	9673.44
25	100.0	DI	96.00	89.02	9762.46
26	80.0	DI	325.00	133.44	9895.90
27	150.0	DI	279.00	375.04	10270.94
28	80.0	DI	330.00	135.49	10406.43
29	100.0	DI	280.00	259.65	10666.08
30	100.0	DI	106.00	98.29	10764.38
31	50.0	DI	110.00	26.69	10791.07
32	80.0	DI	117.00	48.04	10839.10
33	100.0	DI	119.00	110.35	10949.45
34	65.0	DI	70.00	21.82	10971.28
35	50.0	DI	130.00	31.54	11002.82
36	65.0	DI	125.00	38.97	11041.79
37	80.0	DI	150.00	61.59	11103.38
38	100.0	DI	140.00	129.82	11233.20
39	100.0	DI	200.00	185.46	11418.66
40	100.0	DI	138.00	127.97	11546.63
41	65.0	DI	100.00	31.18	11577.81
42	100.0	DI	238.00	220.70	11798.51
43	50.0	DI	87.00	21.11	11819.62
44	80.0	DI	253.00	103.88	11923.49
45	250.0	DI	53.00	137.44	12060.94
46	250.0	DI	131.00	339.72	12400.65
47	100.0	DI	183.00	169.70	12570.35
48	100.0	DI	131.00	121.48	12691.83
49	250.0	DI	174.00	451.23	13143.06
50	250.0	DI	209.00	541.99	13685.05
51	150.0	DI	78.00	104.85	13789.90
52	80.0	DI	157.00	64.46	13854.36
53	80.0	DI	174.00	71.44	13925.80
54	80.0	DI	87.00	35.72	13961.52
55	100.0	DI	131.00	121.48	14083.00
56	50.0	DI	383.00	92.93	14175.93
57	80.0	DI	174.00	71.44	14247.37
58	200.0	DI	105.00	202.93	14450.30
59	250.0	DI	132.00	342.31	14792.61
60	150.0	DI	131.00	176.09	14968.70
61	150.0	DI	131.00	176.09	15144.79
62	200.0	DI	131.00	253.18	15397.97
63	250.0	DI	87.00	225.61	15623.58
64	150.0	DI	151.00	202.98	15826.56
65	200.0	DI	96.00	185.53	16012.10
66	150.0	DI	140.00	188.19	16200.29
67	100.0	DI	50.00	46.37	16246.65
68	100.0	DI	154.00	142.81	16389.46
69	80.0	DI	80.00	32.85	16422.31

70	50.0	DI	130.00	31.54	16453.85
71	65.0	DI	150.00	46.76	16500.61
72	100.0	DI	150.00	139.10	16639.71
73	100.0	DI	155.00	143.73	16783.44
74	150.0	DI	160.00	215.08	16998.52
75	80.0	DI	119.00	48.86	17047.38
76	50.0	DI	130.00	31.54	17078.92
77	80.0	DI	100.00	41.06	17119.98
78	100.0	DI	107.00	99.22	17219.20
79	50.0	DI	135.00	32.76	17251.96
80	80.0	DI	106.00	43.52	17295.48
81	100.0	DI	191.00	177.12	17472.60
82	65.0	DI	174.00	54.25	17526.84
83	80.0	DI	166.00	68.16	17595.00
84	50.0	DI	241.00	58.48	17653.48
85	80.0	DI	72.00	29.56	17683.04
86	65.0	DI	238.00	74.20	17757.24
87	80.0	DI	127.00	52.14	17809.38
88	65.0	DI	40.00	12.47	17821.85
89	80.0	DI	40.00	16.42	17838.27
90	80.0	DI	110.00	45.16	17883.44
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